

# Claims

- [c1] 1. A method for performing database operations on data obtained from a web service, the method comprising:  
creating at least one proxy table in a database, each proxy table mapping to a method of the web service;  
in response to a database operation on a particular proxy table, converting the database operation into a format for invoking a particular method of the web service based upon the corresponding mapping;  
invoking the particular method of the web service;  
converting results obtained from invoking the particular method into data for use at the database based upon the corresponding mapping; and  
performing the database operation on the data at the database.
- [c2] 2. The method of claim 1, wherein the web service comprises a service remotely available via a network.
- [c3] 3. The method of claim 1, wherein the web service has a Web Services Description Language (WSDL) interface.
- [c4] 4. The method of claim 3, wherein said creating step includes creating said at least one proxy table based upon

the WSDL interface.

- [c5] 5. The method of claim 3, wherein said creating step includes substeps of:  
obtaining the WSDL interface from the web service; and  
creating said at least one proxy table based upon the WSDL interface.
- [c6] 6. The method of claim 1, wherein said creating step includes creating meta data identifying a particular method of the web service to be invoked when a database operation is received on a particular proxy table.
- [c7] 7. The method of claim 1, wherein said creating step includes mapping arguments of the method to fields of the proxy table.
- [c8] 8. The method of claim 1, wherein said creating step includes mapping arguments of the method to equivalent database data types.
- [c9] 9. The method of claim 1, wherein said creating step includes creating an object encapsulating the mapping of a web method to the database.
- [c10] 10. The method of claim 1, wherein said creating step includes storing the mapping between said at least one proxy table and methods of the web service.

- [c11] 11. The method of claim 10, wherein said step of converting results includes consulting the mapping for converting the results into data for application at the database.
- [c12] 12. The method of claim 1, wherein the database operation includes a selected one of a SELECT operation, an INSERT operation, a JOIN operation, and a UNION operation.
- [c13] 13. The method of claim 1, wherein said step of converting the database operation includes binding data from the database operation to a Simple Object Access Protocol (SOAP) call for invoking the particular method of the web service.
- [c14] 14. The method of claim 1, wherein said step of converting the database operation includes converting data from the database operation into Extensible Markup Language (XML) format.
- [c15] 15. The method of claim 1, wherein said step of converting the database operation includes creating a Simple Object Access Protocol (SOAP) request for invoking the particular method of the web service.
- [c16] 16. The method of claim 15, wherein said step of invok-

ing the particular method includes transmitting the SOAP request to a remote web service.

[c17] 17. The method of claim 1, wherein said step of invoking the particular method includes receiving results from the web service.

[c18] 18. The method of claim 1, wherein said step of converting results includes converting results received in Simple Object Access Protocol (SOAP) format.

[c19] 19. The method of claim 1, wherein said step of converting results includes converting results received in Extensible Markup Language (XML) format.

[c20] 20. A computer-readable medium having processor-executable instructions for performing the method of claim 1.

[c21] 21. A downloadable set of processor-executable instructions for performing the method of claim 1.

[c22] 22. A system for performing operations at a database on data obtained from a remote service, the system comprising:

a mapping module for creating database tables representing at least some methods of a remote service accessed through a defined interface;

an invocation module for converting a database operation on a database table representing a method of the remote service into a call for invoking the method;  
a communication module for transmitting the call for invoking the method to the remote service, and returning result values from invoking the method to the database;  
and  
a conversion module for converting result values received from the method into database format.

[c23] 23. The system of claim 22, wherein the remote service comprises an application available via a network.

[c24] 24. The system of claim 22, wherein the defined interface comprises a Web Services Description Language (WSDL) interface.

[c25] 25. The system of claim 24, wherein said mapping module creates the database tables based on the WSDL interface.

[c26] 26. The system of claim 22, wherein said mapping module creates meta data identifying a particular method of the remote service to be invoked when an operation is received on a given database table.

[c27] 27. The system of claim 22, wherein said mapping module maps arguments of a method to columns of a

database table.

- [c28] 28. The system of claim 22, wherein each database table created by the mapping module represents a method of the remote service.
- [c29] 29. The system of claim 22, wherein said mapping module creates an object encapsulating the mapping of a method of the remote service to a database table.
- [c30] 30. The system of claim 22, further comprising:  
a mapping repository for storing mappings between database tables and methods of the remote service.
- [c31] 31. The system of claim 30, wherein the conversion module consults the mapping repository for converting result values into database format.
- [c32] 32. The system of claim 22, wherein the operation received on the database table comprises a selected one of a SELECT operation, an INSERT operation, a JOIN operation, and a UNION operation.
- [c33] 33. The system of claim 22, wherein said invocation module binds the data from the operation to a Simple Object Access Protocol (SOAP) call for invoking the method of the remote service.
- [c34] 34. The system of claim 22, wherein said invocation

module converts data from the database operation into Extensible Markup Language (XML) format.

- [c35] 35. The system of claim 22, wherein said invocation module creates a Simple Object Access Protocol (SOAP) request for invoking the method of the remote service.
- [c36] 36. The system of claim 35, wherein said communication module sends the SOAP request to the remote service.
- [c37] 37. The system of claim 22, wherein said conversion module converts result values received in Simple Object Access Protocol (SOAP) format into database data types.
- [c38] 38. The system of claim 22, wherein said conversion module converts result values received in Extensible Markup Language (XML) format into database data types.
- [c39] 39. The system of claim 22, wherein said conversion module provides converted result values in response to the operation on the database table.
- [c40] 40. In a database system, a method for performing database queries on data available from an application, the method comprising:
  - establishing communication between a database and an application having an interface;
  - creating database tables to represent at least some func-

tions of the application based on the interface, each database table corresponding to a function of the application;

in response to a database query received on a database table corresponding to a function of the application, generating input arguments expected by the function based on the database query;

invoking the function with the input arguments and receiving results from invoking the function;

converting the results into a database result set; and returning the database result set in response to the database query.

[c41] 41. The method of claim 40, wherein the application comprises a web service.

[c42] 42. The method of claim 40, wherein the application comprises a service available via a network.

[c43] 43. The method of claim 40, wherein the interface comprises a Web Services Description Language (WSDL) interface.

[c44] 44. The method of claim 40, wherein said step of creating database tables includes creating meta data identifying a particular function to be invoked when an operation is received on a given database table.



- [c45] 45. The method of claim 40, wherein said step of creating database tables includes mapping arguments of a given function to columns of the corresponding database table.
- [c46] 46. The method of claim 40, wherein said step of invoking the function includes binding data from the database query to a Simple Object Access Protocol (SOAP) call.
- [c47] 47. The method of claim 40, wherein said step of invoking the function includes converting data from the database query into Extensible Markup Language (XML) format.
- [c48] 48. The method of claim 40, wherein said step of invoking the function includes creating a Simple Object Access Protocol (SOAP) request for invoking the function.
- [c49] 49. The method of claim 48, wherein said step of invoking the function includes transmitting the SOAP request to a remote server.
- [c50] 50. The method of claim 40, wherein said step of invoking the function includes receiving results in Extensible Markup Language (XML) format.
- [c51] 51. The method of claim 40, wherein said step of invoking the function includes receiving results in Simple Ob-

ject Access Protocol (SOAP) format.

- [c52] 52. The method of claim 40, wherein said step of converting the results includes converting results received in Simple Object Access Protocol (SOAP) format.
- [c53] 53. The method of claim 40, wherein said step of converting the results includes converting results received in Extensible Markup Language (XML) format.
- [c54] 54. A computer-readable medium having processor-executable instructions for performing the method of claim 40.
- [c55] 55. A downloadable set of processor-executable instructions for performing the method of claim 40.